Comparative Influence of Various Tillage Systems on the Soil Vadose Zone Environment. (S06-licht101757-Poster)

Authors:

- M.A.Licht* - *Iowa State University*
- M.Al-Kaisi - *Iowa State University*

Abstract:

The purpose of the study is to evaluate the effect of fall strip-tillage, spring strip-tillage, chisel plow, and no-tillage and time of nitrogen application on soil and water quality and nitrogen use efficiency. Plant and soil samples were collected for several depth increments and analyzed for total carbon, nitrogen, phosphorus, and nitrate nitrogen. Soil temperature, compaction, moisture, emergence, and yield were recorded. Water samples were collected using a suction lysimeter at 1.2 m. Results from 2001 show soil nitrate and phosphorus levels at the top 15 cm soil depth were greater for no-tillage compared to other fall fertilizer treatments (fall strip-tillage and chisel plow). Plant nitrogen uptake for the chisel plow treatment was significantly different at the V6 and V12 growth stages compared to no-tillage and fall strip-tillage with fall fertilizer. Soil resistance at the 0 - 15 cm soil depth was least under the fall chisel plow system compared to other tillage treatments. Soil moisture depletion extended down to 120 cm in the soil profile at 10 weeks after planting for both chisel plow and strip-tillage systems, while maximum depletion occurred at the 60 cm soil depth for no-tillage. Water nitrate samples at the 120 cm depth showed significant differences between tillage treatments for the June 18 sampling period. Yield and emergence index showed no significant differences between the tillage systems, but spring strip-tillage had a slight advantage. Soil temperature was not significantly different for all tillage treatments.

Corresponding Author Information:

Mark Licht
Iowa State University
2104 Agronomy Hall
Ames, IA 50010

phone: 515-294-5414
fax: 515-294-9985
e-mail: lichtma@iastate.edu

Presentation Information:

Presentation Date: Tuesday, November 12, 2002

Presentation Time: 2:00-4:00 pm
Poster Board Number: 1731

Keywords:
tillage, strip tillage, soil quality